CLAIMS

1. An optical fiber for compensating chromatic dispersion over a plurality of bands of the spectrum, including at least the C band,
for wavelength division multiplex transmission networks,
including successively, from the center toward the periphery, a core having a varying index profile and then a cladding of constant index,
the varying index profile of the core comprising successively, from the center toward the periphery,
a central slice whose maximum index is higher than the index of the cladding,
a buried slice whose minimum index is lower than the index of the cladding, and
an annular slice whose maximum index is higher than the index of the cladding and lower than the maximum index of the central slice,
the radii and the indices of each of the slices being determined so that the dispersion compensation optical fiber has,
on the one hand, at the wavelength of 1550 nm,
firstly a chromatic dispersion of less than -8 ps/nm.km,
secondly a chromatic dispersion to dispersion slope ratio whose absolute value is greater than 750 nm, and
thirdly a mode diameter greater than 5 μm,
and on the other hand, at the wavelength of 1625 nm, bending losses for a radius of 10 mm that are less than 400 dB/m.

2. A chromatic dispersion compensation optical fiber according to claim 1, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has, at the wavelength of 1550 nm, a chromatic dispersion to dispersion slope ratio whose absolute value is greater than 1500 nm.

3. A chromatic dispersion compensation optical fiber according to claim 1, characterized in that the chromatic dispersion compensation optical fiber compensates the chromatic dispersion of a line optical fiber over the S, C, L and U bands.

4. A dispersion compensation optical fiber according to claim 1, characterized in that the varying index profile of the core successively comprises, from the center toward the periphery,
a central slice whose maximum index is higher than the index of the cladding,
a buried slice whose minimum index is lower than the index of the cladding, and

an annular slice whose maximum index is higher than the index of the cladding and lower than the maximum index of the central slice.

5. A chromatic dispersion compensation optical fiber according to claim 1 or claim 4, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has, at the wavelength of 1550 nm, a chromatic dispersion from -40 ps/nm.km to -8 ps/nm.km.

6. A chromatic dispersion compensation optical fiber according to claim 5 when dependent on claim 4,
characterized in that the difference (Δn_2) between the minimum index of the buried slice and the index of the cladding is from -3.10^{-3} to 0,
and in that the outside radius (r_2) of the buried slice is from 5.8 μm to 8.5 μm.

7. A chromatic dispersion compensation optical fiber according to claim 6 when dependent on claim 4,
characterized in that the difference (Δn_3) between the maximum index of the annular slice and the index of the cladding is from 1.10^{-3} to 6.10^{-3},
and in that the outside radius (r_3) of the annular slice is from 7.2 μm to 9.7 μm.

8. A chromatic dispersion compensation optical fiber according to claim 5 when dependent on claim 4, characterized in that the value ($S_1 = 2.\int_0^{r1} \Delta n(r).r.dr$) of twice the integral between a zero radius and the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding of the product of the radius by the index difference relative to the cladding is from 39.10^{-3} to 65.10^{-3} μm^2.

9. A chromatic dispersion compensation optical fiber according to claim 5 when dependent on claim 4, characterized in that the value ($S_2 = 2.\int_{r1}^{r2} \Delta n(r).r.dr$) of twice the integral between the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding and the radius (r_2) of the portion of the buried slice having an index lower than the index of the cladding of the product of the radius and the index difference relative to the cladding is from -150.10^{-3} to -10.10^{-3} μm^2.

10. A chromatic dispersion compensation optical fiber according to claim 7 when dependent on claim 4, characterized in that the value ($S_3 = 2.\int_{r2}^{r3} \Delta n(r).r.dr$) of

twice the integral between the radius (r_2) of the portion of the buried slice having an index lower than the index of the cladding and the radius (r_3) of the portion of the annular slice having an index higher than the index of the cladding of the product of the radius and the index difference relative to the cladding is from 30.10^{-3} to 140.10^{-3} μm^2.

11. A chromatic dispersion compensation optical fiber according to claim 8 when dependent on claim 4, characterized in that the value ($S_{11} = 3.\int_0^{r1} \Delta n(r).r^2.dr$) of three times the integral between a zero radius and the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding of the product of the square of the radius and the index difference relative to the index of the cladding is from 59.10^{-3} μm^3 to 123.10^{-3} μm^3.

12. A dispersion compensation optical fiber according to claim 5 when dependent on claim 1, characterized in that the central slice is rectangular.

13. A chromatic dispersion compensation optical fiber according to claim 12, characterized in that the difference (Δn_1) between the maximum index of the central slice and the index of the cladding is from 14.10^{-3} to 20.10^{-3},
and in that the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding is from 1.4 μm to 1.9 μm.

14. A dispersion compensation optical fiber according to claim 5 when dependent on claim 1, characterized in that the central slice is trapezium-shaped.

15. A chromatic dispersion compensation optical fiber according to claim 14, characterized in that the difference (Δn_1) between the maximum index of the central slice and the index of the cladding is from 14.10^{-3} to 20.10^{-3},
in that the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding is from 1.4 μm to 1.9 μm,
and in that the radius (r_{1a}) of the portion of the central slice having the maximum index of the central slice is from 1.31 μm to 1.88 μm.

16. A chromatic dispersion compensation optical fiber according to claim 1 or claim 4, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has, at the wavelength of 1550 nm, a chromatic dispersion of less than -40 ps/nm.km.

17. A chromatic dispersion compensation optical fiber according to claim 16 when dependent on claim 4,
characterized in that the difference (Δn_2) between the minimum index of the

buried slice and the index of the cladding is from -5.5×10^{-3} to 0, and in that the outside radius (r_2) of the buried slice is from 3.7 μm to 6.7 μm.

18. A chromatic dispersion compensation optical fiber according to claim 17 when dependent on claim 4, characterized in that the difference (Δn_3) between the maximum index of the annular slice and the index of the cladding is from 1.10^{-3} to 8.10^{-3}, and in that the outside radius (r_3) of the annular slice is from 6.1 μm to 8.4 μm.

19. A chromatic dispersion compensation optical fiber according to claim 16 when dependent on claim 4, characterized in that the value ($S_1 = 2.\int_0^{r1} \Delta n(r).r.dr$) of twice the integral between a zero radius and the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding of the product of the radius by the index difference relative to the cladding is from 32.10^{-3} to 52.10^{-3} μm^2.

20. A chromatic dispersion compensation optical fiber according to claim 17 when dependent on claim 4, characterized in that the value ($S_2 = 2.\int_{r1}^{r2} \Delta n(r).r.dr$) of twice the integral between the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding and the radius (r_2) of the portion of the buried slice having an index lower than the index of the cladding of the product of the radius and the index difference relative to the cladding is from -70.10^{-3} to -4.10^{-3} μm^2.

21. A chromatic dispersion compensation optical fiber according to claim 18 when dependent on claim 4, characterized in that the value ($S_3 = 2.\int_{r2}^{r3} \Delta n(r).r.dr$) of twice the integral between the radius (r_2) of the portion of the buried slice having an index lower than the index of the cladding and the radius (r_3) of the portion of the annular slice having an index higher than the index of the cladding of the product of the radius and the index difference relative to the cladding is from 7.10^{-3} to 150.10^{-3} μm^2.

22. A chromatic dispersion compensation optical fiber according to claim 19 when dependent on claim 4, characterized in that the value ($S_{11} = 3.\int_0^{r1} \Delta n(r).r^2.dr$) of three times the integral between a zero radius and the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding of the

product of the square of the radius and the index difference relative to the index of the cladding is from $40.10^{-3}\ \mu m^3$ to $80.10^{-3}\ \mu m^3$.

23. A dispersion compensation optical fiber according to claim 16 when dependent on claim 1, characterized in that the central slice is rectangular.

24. A chromatic dispersion compensation optical fiber according to claim 23, characterized in that the difference (Δn_1) between the maximum index of the central slice and the index of the cladding is from 17.10^{-3} to 25.10^{-3},
and in that the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding is from 1.2 μm to 1.7 μm.

25. A dispersion compensation optical fiber according to claim 16 when dependent on claim 1, characterized in that the central slice is trapezium-shaped.

26. A chromatic dispersion compensation optical fiber according to claim 25, characterized in that the difference (Δn_1) between the maximum index of the central slice and the index of the cladding is from 17.10^{-3} to 25.10^{-3},
in that the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding is from 1.2 μm to 1.7 μm,
and in that the radius (r_{1a}) of the portion of the central slice having the maximum index of the central slice is from 1.11 μm to 1.70 μm.

27. A dispersion compensation optical fiber according to claim 4 or claim 16, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has a theoretical cut-off wavelength greater than 1600 nm.

28. A dispersion compensation optical fiber according to claim 1, characterized in that the varying index profile of the core comprises successively, from the center towards the periphery,
a central slice whose maximum index is higher than the index of the cladding,
a buried slice whose minimum index is lower than the index of the cladding,
a first annular slice whose maximum index is higher than the index of the cladding and lower than the maximum index of the central slice, and
a second annular slice whose maximum index is higher than the index of the cladding and higher than the index of the first annular slice.

29. A dispersion compensation optical fiber according to claim 1, characterized in that the varying index profile of the core comprises successively, from the center toward the periphery,
a central slice whose maximum index is higher than the index of the cladding,

a first buried slice whose minimum index is lower than the index of the cladding,
a second buried slice whose minimum index is lower than the index of the cladding and higher than the index of the first buried slice, and
an annular slice whose maximum index is higher than the index of the cladding and lower than the maximum index of the central slice.

30. A dispersion compensation optical fiber according to claim 1, characterized in that the varying index profile of the core comprises successively, from the center toward the periphery,
a central slice whose maximum index is higher than the index of the cladding,
a first buried slice whose minimum index is lower than the index of the cladding,
an annular slice whose maximum index is higher than the index of the cladding and lower than the maximum index of the central slice, and
a second buried slice whose minimum index is lower than the index of the cladding.

31. A dispersion compensation optical fiber according to claim 28, claim 29 or claim 30, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has a theoretical cut-off wavelength greater than 1550 nm.

32. A dispersion compensation optical fiber according to claim 1, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has a dispersion slope whose absolute value is less than 0.02 ps/nm^2.km at the wavelength of 1550 nm.

33. A dispersion compensation optical fiber according to claim 1, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has an effective area greater than 20 μm^2 at the wavelength of 1550 nm.

34. A chromatic dispersion compensation optical fiber according to claim 1, characterized in that the radii and the indices of each of the slices are determined so that the dispersion compensation optical fiber has, at the wavelength of 1550 nm,
a chromatic dispersion from -200 ps/nm.km to -40 ps/nm.km, and
a difference (Δn_1) between the maximum index of the central slice and the index of the cladding from 17.10^{-3} to 25.10^{-3}.

35. A chromatic dispersion compensation optical fiber according to claim 1, characterized in that the radii and the indices of each of the slices are

determined so that the dispersion compensation optical fiber has, at the wavelength of 1550 nm,

a chromatic dispersion less than -40 ps/nm.km,

a difference (Δn_1) between the maximum index of the central slice and the index of the cladding from 17.10^{-3} to 25.10^{-3}, and

a value ($S_2 = 2.\int_{r1}^{r2} \Delta n(r).r.dr$) of twice the integral between the radius (r_1) of the portion of the central slice having an index higher than the index of the cladding and the radius (r_2) of the portion of the buried slice having an index lower than the index of the cladding of the product of the radius and the index difference relative to the cladding that is from -70.10^{-3} to -4.10^{-3} μm^2.

36. A chromatic dispersion compensation optical fiber according to claim 1 or claim 32, characterized in that the radii and the indices of each of the slices are determined such that the dispersion compensation optical fiber has, at the wavelength of 1550 nm,

a chromatic dispersion from -40 ps/nm.km to -15 ps/nm.km, and

a dispersion slope that is negative.

37. A chromatic dispersion compensation optical fiber according to claim 36, characterized in that the difference (Δn_1) between the maximum index of the central slice and the index of the cladding is from 14.10^{-3} to 20.10^{-3}.

38. An optical fiber transmission system comprising the combination of a line optical fiber and a dispersion compensation optical fiber according to claim 1, the dispersion compensation optical fiber being incorporated in the line.

39. An optical fiber transmission system comprising the combination of a line optical fiber and a dispersion compensation optical fiber according to claim 1, the dispersion compensation optical fiber being accommodated in a module.